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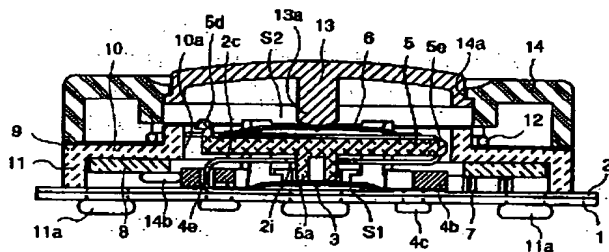
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(54) 【発明の名称】 複合操作型入力装置

(57) 【要約】

【課題】 回転操作と2段式の押圧操作を行うことができ、ズーム機能付きのデジタルカメラへの適用が可能な複合操作型入力装置を提供すること。

【解決手段】 回転操作体14を介して回転駆動される回転式電気部品部と、回転操作体14の中央部の開口14a内に配置されるキートップ13を介して押圧駆動される押圧スイッチ部とを備え、この押圧スイッチ部が、互いに作動力が異なりキートップ13の押圧操作方向に沿って積層配置された第1の押圧スイッチ素子S1と第2の押圧スイッチ素子S2とを有する構成とする。これにより、回転操作と2段式の押圧操作を行うことができコンパクトな複合操作型入力装置が得られる。また、第1および第2の押圧スイッチ素子S1、S2の各クリックばね3、6を接離させるための各固定接点15、17と、回転式電気部品部の摺動子7を摺接させるための摺動パターン16とが、共通のフレキシブル基板2に形成してあれば、部品点数が削減できて組立性も向上する。



【特許請求の範囲】

【請求項1】 開口を有して所定位置に自己復帰する回転可能な回転操作体と、この回転操作体を介して回転駆動される回転式電気部品部と、前記開口内に配置されて前記回転操作体の回転軸線方向に押圧操作されるキートップと、前記回転式電気部品部の中央部に配置され前記キートップを介して押圧駆動される押圧スイッチ部とを備え、

前記押圧スイッチ部が、互いに作動力が異なり前記キートップの押圧操作方向に沿って積層配置された第1の押圧スイッチ素子と第2の押圧スイッチ素子とを有することを特徴とする複合操作型入力装置。

【請求項2】 請求項1の記載において、前記第1および第2の押圧スイッチ素子のうち、少なくとも前記キートップに近い側に配置されている押圧スイッチ素子の固定接点をフレキシブル基板に形成したことを特徴とする複合操作型入力装置。

【請求項3】 請求項2の記載において、前記回転式電気部品部が前記回転操作体と一体的に回転する摺動子を摺接させるための摺動パターンを有しており、この摺動パターンと前記第1および第2の押圧スイッチ素子の各固定接点をすべて前記フレキシブル基板に形成したことを特徴とする複合操作型入力装置。

【請求項4】 請求項2または3の記載において、前記押圧スイッチ部が、前記第1の押圧スイッチ素子と前記第2の押圧スイッチ素子との間に介在して一方の押圧スイッチ素子を押圧駆動する駆動体と、前記キートップの押圧操作方向に沿う前記駆動体の移動を案内するガイド手段と、前記第1および第2の押圧スイッチ素子がそれぞれ入力時にクリック感触を生起するようになすクリック手段とを有することを特徴とする複合操作型入力装置。

【請求項5】 請求項4の記載において、前記第1および第2の押圧スイッチ素子を搭載する支持部材を備え、かつ、前記押圧スイッチ部を囲むように配置されて前記キートップの押圧操作方向に延びる複数のガイド突起を前記支持部材に一体的に設けて前記ガイド手段となしたことを特徴とする複合操作型入力装置。

【請求項6】 請求項5の記載において、複数の前記ガイド突起と、これらガイド突起の基端側を連結する枠状部と、この枠状部から前記ガイド突起とは逆向きに延びる複数の取付突起とを有するガイド体を備え、前記フレキシブル基板を前記枠状部と前記支持部材とで挟持した状態で該支持部材に前記取付突起を取り付けたことを特徴とする複合操作型入力装置。

【請求項7】 請求項5または6の記載において、前記ガイド突起が弾性変形可能な柱状であるとともに、このガイド突起の自由端側に前記駆動体を係止可能な爪部を設けたことを特徴とする複合操作型入力装置。

【請求項8】 請求項4の記載において、前記回転式電

気部品部が前記回転操作体と一体的に回転する摺動子を摺接させるための摺動パターンを有しており、この摺動パターンと前記第1および第2の押圧スイッチ素子の各固定接点をすべて前記フレキシブル基板の同一面に形成するとともに、このフレキシブル基板をS字状に屈曲させて、前記キートップに近い側に配置される前記押圧スイッチ素子の固定接点形成領域を前記駆動体上に載置したことを特徴とする複合操作型入力装置。

【請求項9】 請求項8の記載において、前記駆動体に対の掛け止め部を設けるとともに、前記フレキシブル基板に前記対の掛け止め部にそれぞれが掛止される一対の被掛止部を設けたことを特徴とする複合操作型入力装置。

【請求項10】 請求項1～9のいずれかの記載において、前記回転式電気部品部が前記回転操作体の回転に伴って弾性変形するばね部材を有することを特徴とする複合操作型入力装置。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】本発明は、回転操作と押圧操作とが行える複合操作型入力装置に係り、特に、デジタルカメラ等に使用して好適な複合操作型入力装置に関する。

【0002】

【従来の技術】最近、回転可能なつまみ（回転操作体）の中央部にキートップを配置し、つまみを回転操作すると抵抗値等の出力信号を変化させることができ、キートップを押圧操作するとプッシュスイッチのオン・オフ切替が行えるようにした複合操作型の入力装置が普及しつつある。従来のこの種の入力装置は、つまみを介して回転駆動される回転式電気部品部の内側に、キートップを介して押圧駆動される押圧スイッチ部を配設して概略構成され、回転式電気部品部には、摺動パターンに摺接してつまみと一体的に回転する摺動子が組み込まれており、また押圧スイッチ部には、可動接点と固定接点を対向せしめたクリック機構付きの押圧スイッチ素子が組み込まれている。それゆえ、つまみの回転操作とキートップの押圧操作という2種類の入力操作を選択的に行うことができ、コンパクトな複合操作型の入力装置として各種電子機器への適用が期待されている。

【0003】

【発明が解決しようとする課題】上述した従来の複合操作型入力装置は、回転操作と押圧操作という2種類の入力操作を選択的に行うことはできるが、例えばズーム機能付きのデジタルカメラの場合、回転操作が好適なズームリングと、2段式の押圧操作が好適な焦点合わせおよびシャッター操作に対応できる入力装置が要求されるため、かかる電子機器に従来品を適用させることはできなかった。

【0004】本発明はこのような従来技術の実情に鑑み

てなされたもので、その目的は、回転操作と2段式の押圧操作を行うことができ、ズーム機能付きのデジタルカメラへの適用が可能なコンパクトな複合操作型入力装置を提供することにある。

【0005】

【課題を解決するための手段】上述した目的を達成するため、本発明の複合操作型入力装置は、開口を有して所定位置に自己復帰する回転可能な回転操作体と、この回転操作体を介して回転駆動される回転式電気部品部と、前記開口内に配置されて前記回転操作体の回転軸線方向に押圧操作されるキートップと、前記回転式電気部品部の中央部に配置され前記キートップを介して押圧駆動される押圧スイッチ部とを備え、前記押圧スイッチ部が、互いに作動力が異なり前記キートップの押圧操作方向に沿って積層配置された第1の押圧スイッチ素子と第2の押圧スイッチ素子とを有する構成とした。

【0006】このように構成される入力装置では、キートップを押し込むと、まず作動力の小なる一方の押圧スイッチ素子がオフからオンに切り替わり、さらにキートップを押し込むと、作動力の大なる他方の押圧スイッチ素子がオフからオンに切り替わるので、2段式の押圧操作が行える。また、回転操作体を回転させることによって、回転式電気部品部の出力信号を変化させることができ、その回転操作力を除去すると回転操作体は所定位置に自己復帰する。なお、回転操作体を自己復帰させるセルフリターン機構として、回転式電気部品部に、回転操作体の回転に伴って弾性変形するばね部材を組み込んでおけば、好ましい。

【0007】また、かかる構成において、第1および第2の押圧スイッチ素子のうち少なくともキートップに近い側に配置されている押圧スイッチ素子の固定接点は、フレキシブル基板に形成しておくことが好ましい。特に、回転式電気部品部が、回転操作体と一体的に回転する摺動子を摺接させるための摺動パターンを有している一般的な構成の場合、この摺動パターンと第1および第2の押圧スイッチ素子の各固定接点をすべて共通のフレキシブル基板に形成しておけば、部品点数が少なくて組立性も良好な複合操作型入力装置が得られる。

【0008】また、かかる構成において、押圧スイッチ部が、第1の押圧スイッチ素子と第2の押圧スイッチ素子との間に介在して一方の押圧スイッチ素子を押圧駆動する駆動体と、キートップの押圧操作方向に沿う駆動体の移動を案内するガイド手段と、第1および第2の押圧スイッチ素子がそれぞれ入力時にクリック感触を生起するようになすクリック手段とを有していれば、駆動体をキートップの押圧操作方向に沿って円滑にスライド移動させることができるため、ヒンジ機構等の大型化しやすい押圧駆動機構を採用する必要がなくなって、装置の小型化が図りやすくなる。その際、押圧スイッチ部を囲むように配置されてキートップの押圧操作方向に延びる複

数のガイド突起を、第1および第2の押圧スイッチ素子を搭載する支持部材に一体的に設けて前記ガイド手段となせば、小型化に好適な複数のガイド突起によって、駆動体のスライド移動を一層円滑に行わせることができる。

【0009】なお、この複合操作型入力装置が、前記ガイド突起と、これらガイド突起の基端側を連結する枠状部と、この枠状部からガイド突起とは逆向きに延びる複数の取付突起とを有するガイド体を備え、前記フレキシブル基板を枠状部と前記支持部材とで挟持した状態で該支持部材に取付突起を取り付ける構成にしてあれば、支持部材上のフレキシブル基板の浮きを防止できるので好ましい。また、前記ガイド突起を弾性変形可能な柱状とし、このガイド突起の自由端側に駆動体を係止可能な爪部が設けてあれば、構成を複雑化することなく、駆動体の脱落防止や非操作時の高さ位置規定が行えて、組立性も向上するので、好ましい。

【0010】また、回転式電気部品部が、回転操作体と一体的に回転する摺動子を摺接させるための摺動パターンを有している一般的な構成の場合、この摺動パターンと第1および第2の押圧スイッチ素子の各固定接点をすべて共通のフレキシブル基板の同一面に形成し、このフレキシブル基板をS字状に屈曲させて、キートップに近い側に配置される押圧スイッチ素子の固定接点形成領域を前記駆動体上に載置するという構成にしておけば、導電パターンを片面のみに形成した安価で組み込み作業も容易なフレキシブル基板が使用できるので、好ましい。その際、駆動体に対の掛け止め部を設けるとともに、フレキシブル基板に前記一對の掛け止め部にそれぞれが掛止される一對の被掛止部を設けておけば、両面粘着シート等を用いることなく簡単にフレキシブル基板が駆動体に取り付けられるので、組立性の向上が図れる。

【0011】

【発明の実施の形態】実施形態例について図面を参照しつつ説明すると、図1は本発明の一実施形態例に係る複合操作型入力装置の分解斜視図、図2は該入力装置の平面図、図3は図2のA-A線に沿う断面図、図4は図2のB-B線に沿う断面図、図5はキートップを省略して示す該入力装置の平面図、図6は該入力装置の回転操作体の底面図、図7は該入力装置のキートップの平面図、図8は該入力装置の収納体の平面図、図9は該収納体の底面図、図10は該収納体の断面図、図11は該入力装置の摺動子付き摺動子受けの底面図、図12は該入力装置のフレキシブル基板の展開図、図13は該入力装置の駆動体の平面図、図14は該駆動体の側面図、図15は該入力装置のガイド体の平面図、図16は該ガイド体の側面図、図17は該入力装置の支持板の平面図、図18は該入力装置のセルフリターン機構およびストッパ機構を示す非操作時の説明図、図19は図18に対応する回転操作時の説明図である。

【0012】図1～図5に全体の構成を示す複合操作型入力装置は、ズーム機能付きのデジタルカメラに適用される装置である。この入力装置は、金属板等からなる支持板1と、ポリエステルフィルム等の絶縁性のベース材に導電パターンが形成されているフレキシブル基板2と、第1の可動接点を兼ねるドーム状の第1のクリックばね3と、複数本のガイド突起4aを有する合成樹脂製のガイド体4と、押圧突起5aを有し前記ガイド突起4aに案内されて昇降可能な合成樹脂製の駆動体5と、第2の可動接点を兼ねるドーム状の第2のクリックばね6と、金属製の摺動子7と、この摺動子7を取り付けた合成樹脂製の摺動子受け8と、天井部10や筒状部11を有する合成樹脂製の収納体9と、セルフリターン用のトーションばね12と、合成樹脂製のキートップ13と、摺動子受け8に一体化される合成樹脂製の回転操作体14とによって主に構成されている。

【0013】支持板1には図1および図17に示すように、ガイド体4を取り付けるための3個の小孔1aと、収納体9を取り付けるため小孔1aを包囲するように配置された6個の角孔1bと、支持板1自身を図示せぬ外部機構に取り付けるため四隅に配置された丸孔1cとが穿設されている。

【0014】フレキシブル基板2は図12に示すように、矩形状の基部2aと、この基部2aの一边から切り込み2bを設けて延びる帯状部2cと、この帯状部2cに対して直角な向きに基部2aの一边から延びる帯状の引出部2dとを具備している。基部2aには、円周状に配置された4個の長孔2eおよび2個の切欠き2fと、長孔2eよりも内側に配置された2個の小孔2gと、四隅に位置する取付孔2hとが設けられている。帯状部2cには、駆動体5の押圧突起5aを挿通するための丸孔2iと、駆動体5に係止させるための一对の係止孔2j、2kとが設けられている。そして、このフレキシブル基板2の片面には、基部2a上に一对の第1の固定接点15および円弧状の摺動パターン16が形成され、かつ帯状部2cの先端部上に一对の第2の固定接点17が形成され、さらに各固定接点15、17や摺動パターン16を引出部2d上へと導く引廻し線18が形成されている。なお、これらの導電パターンは銀やカーボン等の導電ペーストを印刷して形成されたものであり、摺動パターン16には略帯状（円弧状）の抵抗パターン（外側のパターン）と集電パターン（内側のパターン）とが設けられている。また、これらの導電パターンは、第1および第2の固定接点15、17や摺動パターン16や引出部2dの先端部に位置する引き廻し線18を除いて、絶縁性のレジスト層19（図12のハッチング部分）によって被覆されている。

【0015】このフレキシブル基板2は、その取付孔2hを前記丸孔1cに合致させるとともに、長孔2eおよび切欠き2fを前記角孔1bに合致させた状態で、基部

2aが支持板1上に載置される。また、フレキシブル基板2の帯状部2cは、図1、3に示すように、S字状に屈曲させた状態で組み込まれる。

【0016】第1の可動接点を兼ねるドーム状の第1のクリックばね3は、ステンレス製の板ばねで形成され、例えば板厚が0.07mmで直径が5mmのドーム形状にフォーミングされている。このクリックばね3は、フレキシブル基板2の基部2aの第1の固定接点15形成領域上に載置され、外側の円環状の固定接点15には常時接触し内側の円形状の固定接点15には接離可能に対向している。なお、このクリックばね3は、片面に粘着剤が塗布された図示せぬ絶縁シートで覆うようにしてフレキシブル基板2に固定されている。そして、第1のクリックばね3と第1の固定接点15とで第1の押圧スイッチ素子S1が構成されていて、このクリックばね3にやや大きな押圧操作力を加えることにより、反転したクリックばね3の中央部を、対向する円形状の固定接点15に接触させて、内側と外側の固定接点15どうしの導通が図れるようになっている。

【0017】第2の可動接点を兼ねるドーム状の第2のクリックばね6も、ステンレス製の板ばねで形成されているが、例えば板厚が0.05mmで直径が6mmのドーム形状にフォーミングされているので、第1のクリックばね3よりも小さな押圧操作力で中央部を反転させることができる。この第2のクリックばね6は、フレキシブル基板2の帯状部2cの第2の固定接点17形成領域上に載置され、外側の円環状の固定接点17には常時接触し内側の円形状の固定接点17には接離可能に対向している。なお、このクリックばね6も第1のクリックばね3と同様に、片面に粘着剤が塗布された図示せぬ絶縁シートで覆うようにしてフレキシブル基板2に固定されている。そして、第2のクリックばね6と第2の固定接点17とで第2の押圧スイッチ素子S2が構成されていて、このクリックばね6に比較的軽い押圧操作力を加えることにより、反転したクリックばね6の中央部を、対向する円形状の固定接点17に接触させて、内側と外側の固定接点17どうしの導通が図れるようになっている。

【0018】ガイド体4は図1および図15、16に示すように、弾性変形可能な柱状の4本のガイド突起4aと、各ガイド突起4aの基端側を連結する枠状部4bと、この枠状部4bからガイド突起4aとは逆向きに延びる3本の取付突起4cとを具備している。各ガイド突起4aの先端側（自由端側）には、内方へ突出する爪部4dが設けられている。また、枠状部4bには、その一部を外方へL字状に突出させることにより、係合溝4eが設けられている。

【0019】このガイド体4は、各取付突起4cを、フレキシブル基板2の小孔2gおよび切り込み2bや支持板1の小孔1aに挿通して、枠状部4bをフレキシブル

基板2の基部2a上に載置した状態で、各取付突起4cの先端部を支持板1の底面に熱がしめすることにより、支持板1に固定される。これにより、杵状部4bの内側の空間に第1の押圧スイッチ素子S1が配置された状態となるが、フレキシブル基板2の基部2aが杵状部4bと支持板1との間に挟持されるため、この押圧スイッチ素子S1が支持板1から浮いてしまう心配はない。

【0020】駆動体5は図1および図13、14に示すように、第1のクリックばね3を押し込むための押圧突起5aと、この押圧突起5aを中央部から突出させている平板状部5bと、この平板状部5bの外周部の4箇所に形成されそれぞれにガイド突起4aが遊挿される係合切欠き5cと、平板状部5bから側方へ突出するL字状のフック5dと、このフック5dとは逆側で平板状部5bから側方へ突出する小突起5eとを具備している。

【0021】この駆動体5は、フレキシブル基板2の帯状部2cに設けられている一対の係止孔2j、2kをそれぞれ、フック5dと小突起5eとに掛け止めることによって、帯状部2cの第2の固定接点17形成領域を弛みのない状態で平板状部5b上に載置する。それゆえ、第2の押圧スイッチ素子S2が平板状部5bから浮いてしまう心配はない。また、図3に示すように、駆動体5の押圧突起5aが、S字状に屈曲された帯状部2cの丸孔2iに挿通されるとともに、この丸孔2iよりも基部2aに近い側において帯状部2cの折返し部分が、ガイド体4の係合溝4eに挿入される。そして、帯状部2cを掛け止めた駆動体5の係合切欠き5cをガイド体4のガイド突起4aに位置あわせした状態で、各ガイド突起4aを外方へ撓ませながら平板状部5bを押し込めば、各ガイド突起4aの撓みが解除された段階で、駆動体5はガイド体4の内側に昇降可能に組み込まれて、押圧突起5aが第1のクリックばね3上に搭載されることとなる。なお、駆動体5の昇降動作は、係合切欠き5c内のガイド突起4aにより案内されるので円滑に行われる。また、各ガイド突起4aの先端側の爪部4dによって、駆動体5の上方への抜け止めが行われるとともに、非操作時における駆動体5の高さ位置が規定されるようになっている。

【0022】摺動子受け8は図1および図11に示すように、外周形状が多角形状で中央部に開口8aを有する平板なリング体であり、等間隔な4箇所に連結孔8bが形成されている。摺動子受け8の底面には摺動子7が取り付けられてあり、この摺動子7はフレキシブル基板2の基部2a上の摺動パターン16に摺接する。

【0023】収納体9は図1および図8～図10に示すように、中央部に開口10aを有して4箇所に円弧状の長孔10bを設けた天井部10と、この天井部10上に立設されたストッパ突起10cと、天井部10の外周部から下方へ垂設された筒状部11と、この筒状部11の底面に6箇所突設された等間隔な取付突起11aとを具

備している。また、天井部10上には、セルフリターン用のトーションばね12を内側から位置規制する環状壁10dと、トーションばね12の端部にテーパ面10eを衝止させるばね受け部10fとが立設されていて、環状壁10dとばね受け部10fとの間にトーションばね12が組み込まれる。

【0024】図3、4に示すように、この収納体9の開口10a内には、第2の押圧スイッチ素子S2を載置した駆動体5やガイド体4のガイド突起4aが配置される。また、収納体9の筒状部11の内側には、天井部10に対向させた状態で摺動子受け8が配置され、この摺動子受け8の外周面が筒状部11の内周面と摺接する。そして、収納体9の天井部10上に配置させた回転操作体14の4本の連結突起14bをそれぞれ、長孔10bに挿通し、さらに摺動子受け8の連結孔8bに挿通して、各連結突起14bの先端部を摺動子受け8の底面に熱がしめすることにより、回転操作体14と摺動子受け8とが一体化される。したがって、回転操作体14の回転動作は、摺動子受け8の外周面に対し軸受面として機能する筒状部11の内周面によって案内されることとなる。

【0025】回転操作体14は図1、2および図5、6に示すように、キートップ13を配置させるための開口14aを中央部に有する。この回転操作体14の底面には、等間隔な4箇所に連結突起14bが突設されていて、これらの連結突起14bにより摺動子受け8との一体化がなされる。回転操作体14の底面にはまた、収納体9の天井部10との間に介設されるトーションばね12の端部を押し込むためのばね押圧壁部14cと、天井部10上のストッパ突起10cを移動可能に挿入して回転量を規制するためのストッパ移動路14dとが設けられている。なお、キートップ13は、回転操作体14により回り止めされた状態で、内底面中央に突設された押圧突起13aが第2のクリックばね6上に搭載され、図3、4に示すように回転操作体14の内壁部がキートップ13の昇降動作を案内するようになっている。

【0026】このように構成される複合操作型入力装置の動作説明を行うにあたって、まずキートップ13を介して押圧駆動される押圧スイッチ部の動作について説明し、次に回転操作体14を介して回転駆動される回転式電気部品部の動作について説明する。

【0027】いま、操作者が手指でキートップ13を押し込んでいくと、まず所定量押し込んだ時点で、キートップ13の押圧突起13aが作動力の小なる第2のクリックばね6を反転動作させるので、第2の押圧スイッチ素子S2がオフからオン状態へと切り替わる。そして、キートップ13をさらに押し込んでいくと、第2の押圧スイッチ素子S2をオン状態に保ったまま駆動体5が下降していくので、この駆動体5の押圧突起5aが作動力の大なる第1のクリックばね3を反転動作させて、第1

の押圧スイッチ素子S 1がオフからオン状態へと切り替わる。したがって、操作者は、キートップ1 3を軽く押し込んでいるときにクリック感が生起されれば第2の押圧スイッチ素子S 2がオンしたことを感得でき、キートップ1 3を強く押し込んでいるときにクリック感が生起されれば第1の押圧スイッチ素子S 1がオンしたことを感得できる。具体的には、本実施形態例の場合、第2の押圧スイッチ素子S 2がオンするとデジタルカメラの焦点合わせが行われ、第1の押圧スイッチ素子S 1がオンするとシャッター操作が行われるようになってい

る。

【0028】また、操作者が回転操作体1 4を回転させると、摺動子7が一体的に回転して摺動パターン（抵抗パターンと集電パターン）1 6上を摺動するので、回転移動した摺動子7の位置に応じた抵抗値が出力されることとなる。すなわち、回転操作体1 4の回転量に応じて異なる抵抗値を出力させることができ、本実施形態例の場合、回転操作体1 4の回転操作によりデジタルカメラのズームが行われるようになっている。

【0029】この回転操作体1 4のセルフリターン機構について説明すると、図1 8に示すように、回転操作体1 4が回転操作されていないときには、一対のばね押圧壁部1 4 c及びばね受け部1 0 fの一対のテーパ面1 0 eがトーションばね1 2の両端部に弾接しているが、回転操作体1 4を回転させると図1 9に示すように、一方のばね押圧壁部1 4 cがトーションばね1 2の一方の端部から離れ、該端部が収納体9のばね受け部1 0 fのテーパ面1 0 eに衝止された状態で、他方の端部が他方のばね押圧壁部1 4 cに押し撓められていく。それゆえ、回転操作体1 4に対する回転操作力を除去すると、押し撓められていたトーションばね1 2の端部によってばね押圧壁部1 4 cが押し戻されることになって、回転操作体1 4は図1 8に示す所定位置へと自己復帰する。つまり、操作者が回転操作体1 4から手指を離せば、自動的にズーム倍率が元の状態に復帰するようになっている。

また、回転操作体1 4を回転させると、収納体9のストッパ突起1 0 cがストッパ移動路1 4 dに沿って移動し、回転操作体1 4を所定量回転させた時点で、図1 9に示すようにストッパ突起1 0 cはストッパ移動路1 4 dの端面に当接して回転操作体1 4のさらなる回転が規制されるようになっている。それゆえ、回転操作体1 4に過大な回転操作力が加わった場合にも、連結突起1 4 bが収納体9の長孔1 0 bの端面に衝突して破損する心配はない。

【0030】上述したように本実施形態例においては、キートップ1 3を押し込むと、まず作動力の小なる一方の押圧スイッチ素子S 2がオフからオンに切り替わり、さらにキートップ1 3を押し込むと、作動力の大なる他方の押圧スイッチ素子S 1がオフからオンに切り替わるので、2段式の押圧操作が行える。また、回転操作体1

4を回転させることによって、回転式電気部品部の出力信号を適宜変化させることができ、この回転操作体1 4をセルフリターン機構により所定位置へ自己復帰させることもできる。したがって、この複合操作型入力装置をデジタルカメラに適用する際には、2段式の押圧操作が好適な焦点合わせおよびシャッター操作を第1および第2の押圧スイッチ素子S 1、S 2にて行わせ、かつ回転操作が好適なズームを回転操作体1 4にて行わせれば、操作性が向上し小型化も促進できる。なお、本実施形態例では押圧操作時に、キートップ1 3に近い第2のクリックばね6が先に反転動作し、次いで下方の第1のクリックばね3が反転動作するように設定してあるが、先行して反転動作する作動力の小なるクリックばねを下方に配置させてもよい。

【0031】また、上述した複合操作型入力装置は、第1および第2の押圧スイッチ素子S 1、S 2と回転式電気部品部の摺動パターン1 6がすべて共通のフレキシブル基板2の同一面に形成してあるとともに、このフレキシブル基板2をS字状に屈曲させて上方の押圧スイッチ素子（第2の押圧スイッチ素子S 2）の固定接点形成領域を駆動体5上に載置するという構成にしてあるので、フレキシブル基板2として、導電パターンを片面のみに形成した安価なものが使用でき、その組み込み作業も容易である。しかも、このフレキシブル基板2は、一対の係止孔2 j、2 kをそれぞれ駆動体5のフック5 dと小突起5 eとに掛け止めることにより、帯状部2 cの固定接点形成領域を弛みのない状態で平板状部5 b上に載置することができるので、両面粘着シート等を用いることなく簡単にフレキシブル基板2を駆動体5に取り付けることができる。

【0032】

【発明の効果】本発明は以上説明したような形態で実施され、以下に記載されるような効果を奏する。

【0033】回転操作体を介して回転駆動される回転式電気部品部と、回転操作体の開口内に配置されるキートップを介して押圧駆動される押圧スイッチ部とを備え、この押圧スイッチ部が、互いに作動力が異なりキートップの押圧操作方向に沿って積層配置された第1の押圧スイッチ素子と第2の押圧スイッチ素子とを有する複合操作型入力装置なので、回転操作と2段式の押圧操作を行うことができ装置の小型化も図りやすく、ズーム機能付きのデジタルカメラへの適用が可能となる。

【0034】また、第1および第2の押圧スイッチ素子の各固定接点と回転式電気部品部の摺動パターンとをすべて共通のフレキシブル基板に形成しておけば、部品点数の削減や組立性の向上が図りやすくなる。その際、フレキシブル基板の同一面に各固定接点および摺動パターンを形成し、このフレキシブル基板をS字状に屈曲させて、一方の押圧スイッチ素子を押圧駆動する駆動体上に、他方の押圧スイッチ素子の固定接点形成領域を載置

するという構成にしておけば、導電パターンを片面のみに形成した安価で組み込み作業も容易なフレキシブル基板が使用できる。

【図面の簡単な説明】

【図1】本発明の一実施形態例に係る複合操作型入力装置の分解斜視図である。

【図2】該入力装置の平面図である。

【図3】図2のA-A線に沿う断面図である。

【図4】図2のB-B線に沿う断面図である。

【図5】キートップを省略して示す該入力装置の平面図である。

【図6】該入力装置の回転操作体の底面図である。

【図7】該入力装置のキートップの平面図である。

【図8】該入力装置の収納体の平面図である。

【図9】該収納体の底面図である。

【図10】該収納体の断面図である。

【図11】該入力装置の摺動子付き摺動子受けの底面図である。

【図12】該入力装置のフレキシブル基板の展開図である。

【図13】該入力装置の駆動体の平面図である。

【図14】該駆動体の側面図である。

【図15】該入力装置のガイド体の平面図である。

【図16】該ガイド体の側面図である。

【図17】該入力装置の支持板の平面図である。

【図18】該入力装置のセルフリターン機構およびストッパ機構を示す非操作時の説明図である。

【図19】図18に対応する回転操作時の説明図である。

【符号の説明】

1 支持板（支持部材）

2 フレキシブル基板

2 a 基部

2 c 帯状部

2 j, 2 k 係止孔（被掛止部）

3 第1のクリックばね

4 ガイド体

4 a ガイド突起

4 b 棒状部

4 c 取付突起

4 d 爪部

5 駆動体

5 a 押圧突起

5 b 平板状部

5 d フック（掛け止め部）

5 e 小突起（掛け止め部）

6 第2のクリックばね

7 摺動子

8 摺動子受け

9 収納体

10 天井部

11 筒状部

11 a 取付突起

12 トーションばね（ばね部材）

13 キートップ

14 回転操作体

14 a 開口

14 b 連結突起

15 第1の固定接点

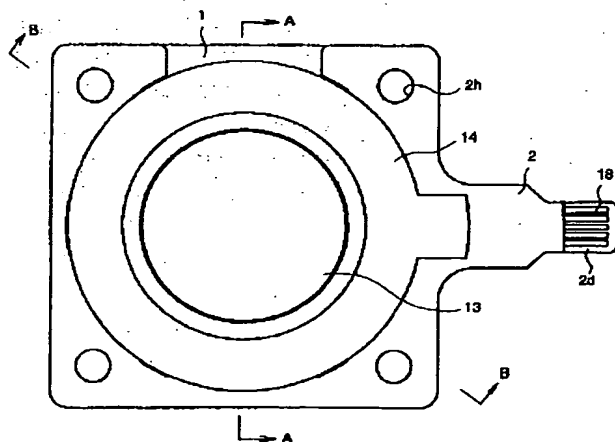
16 摺動パターン

17 第2の固定接点

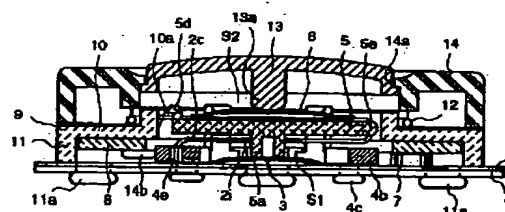
S1 第1の押圧スイッチ素子

S2 第2の押圧スイッチ素子

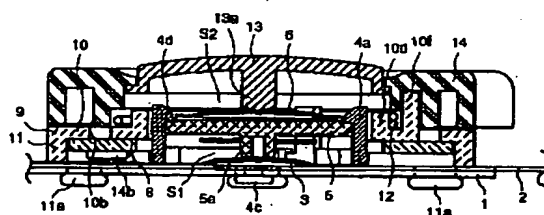
【図2】



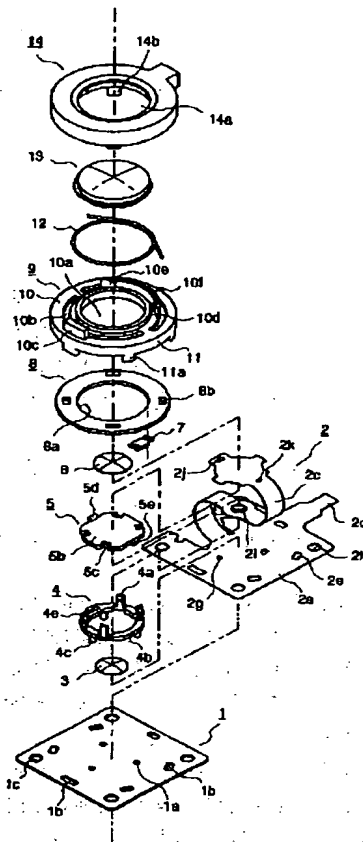
【図3】



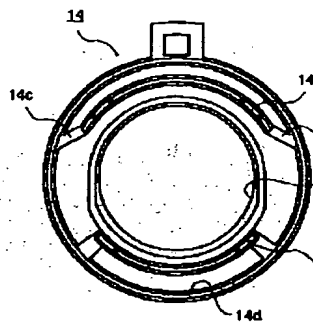
【図4】



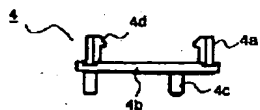
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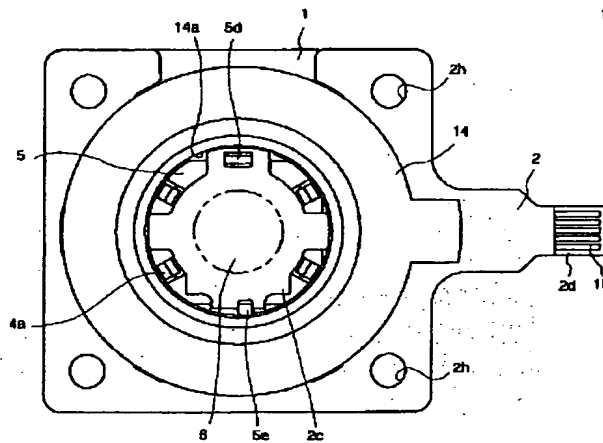
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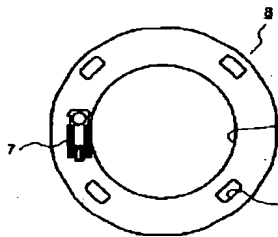
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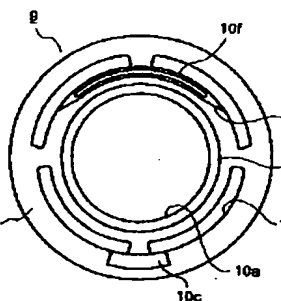
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【図11】

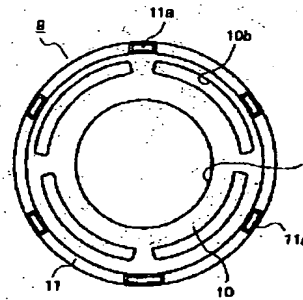


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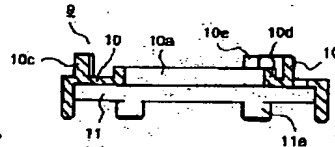


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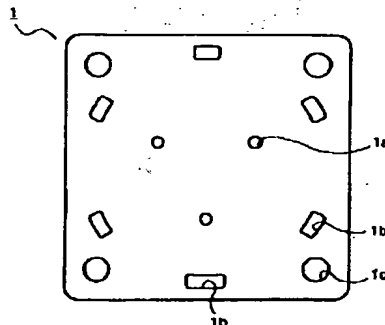
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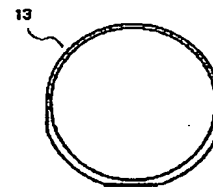
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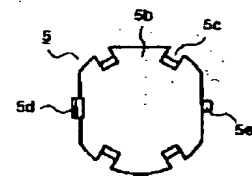
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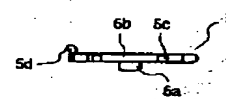
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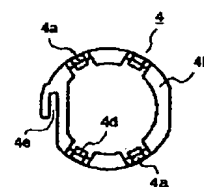
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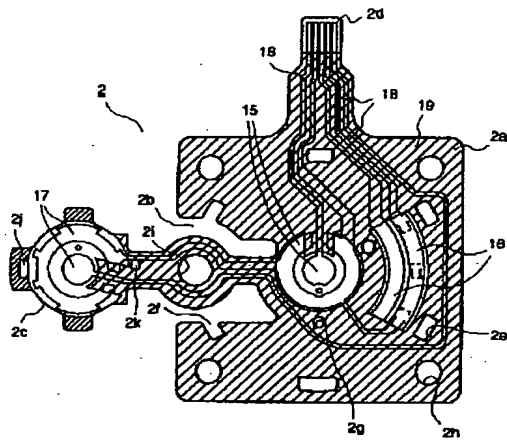
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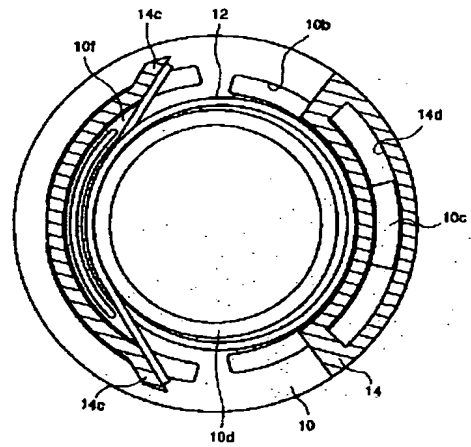
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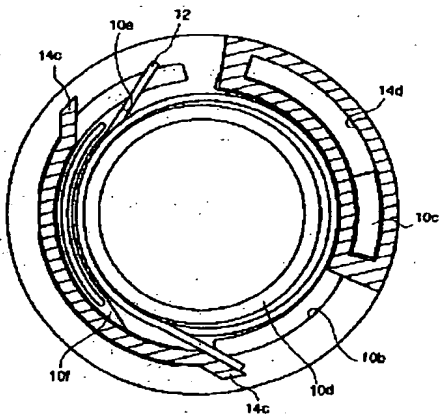
【図12】



【図18】



【図19】



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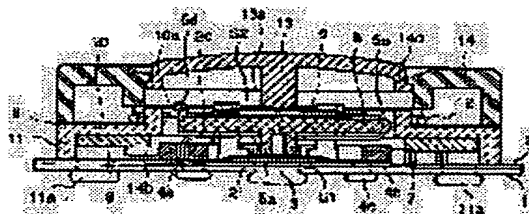
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(54) COMBINED CONTROL INPUT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a combined control input device, which can perform rotational operation and 2-stage press operation, and which is applicable to a digital camera with a zoom function.

SOLUTION: This has a constitution equipped with a rotary electrical parts portion which is driven to rotate via a rotational operation body 14, and with a push switching portion which is driven by pressing through a key-top 13 arranged within an opening 14a in the central part of the rotation operation body 14, wherein the push switching portion has the first element S1 and the second element S2, which have mutually different actuation forces laminated and arranged in the direction of the push operation of the key-top 13. By this, a compact and combined control input device is obtained which can perform a rotation operation and 2-stage press operation. In addition, if respectively fixed contact points 15, 17 to connect and separate respective click springs 3, 6 of the first and second push switch elements S1, S2 and a sliding pattern 16 to make a slider 7 of the rotary electrical parts portion slide-contact have been formed on a common flexible substrate 2, the number of parts can be reduced and an assembling efficiency is also improved.



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CLAIMS

[Claim(s)]

[Claim 1] Combined-control blocking force equipment characterized by providing the following. The rotation operation object which has opening and carries out self-reset to a predetermined position and which can be rotated. The rotating type electrical-part section by which a rotation drive is carried out through this rotation operation object. The keytop by which is arranged in the aforementioned opening and press operation is carried out in the direction of axis of rotation of the aforementioned rotation operation object. The 1st press switching device and the 2nd press switching device by which actuation loads differed [the aforementioned press switch section] mutually by having the press switch section by which is arranged in the center section of the aforementioned rotating type electrical-part section, and a press drive is carried out through the aforementioned keytop, and laminating arrangement was carried out along the press operation direction of the aforementioned keytop

[Claim 2] Combined-control blocking force equipment characterized by forming in a flexible substrate the stationary contact of the press switching device arranged among the above 1st and the 2nd press switching device at the side near the aforementioned keytop at least in the publication of a claim 1.

[Claim 3] Combined-control blocking force equipment characterized by having the sliding pattern for the aforementioned rotating type electrical-part section making the aforementioned rotation operation object and the sliding child rotated in one *** in the publication of a claim 2, and forming the whole of each stationary contact of this sliding pattern, the above 1st, and the 2nd press switching device in the aforementioned flexible substrate.

[Claim 4] The publication of claims 2 or 3 characterized by providing the following. The driver with which the aforementioned press switch section intervenes between the press switching device of the above 1st, and the press switching device of the above 2nd, and carries out the press drive of one press switching device. A guide means to guide movement of the aforementioned driver which meets in the press operation direction of the aforementioned keytop. The click means made as [occur / a click feel /, respectively / the above 1st and the 2nd press switching device / at the time of an input]

[Claim 5] Combined-control blocking force [of carrying out having prepared in one two or more guide salients which are arranged so that it may have the supporter material which carries the above 1st and the 2nd press switching device in the publication of a claim 4 and the aforementioned press switch section may be surrounded, and are prolonged in the press operation direction of the aforementioned keytop to the aforementioned supporter material, and having made with the aforementioned guide means as the feature] equipment.

[Claim 6] The frame which connects the end face side of two or more aforementioned guide salients and these guide salient in the publication of a claim 5, and this frame to the aforementioned guide salient is combined-control blocking force [carry out having attached the aforementioned attachment salient to this supporter material in the state where of had the guide object which it has in two or more attachment salients prolonged in a retrose, and the aforementioned flexible substrate was pinched at the aforementioned frame and the aforementioned supporter material as the feature] equipment.

[Claim 7] Combined-control blocking force equipment with which the aforementioned guide salient is characterized by the thing with possible elastic deformation established for the claw part which can stop the aforementioned driver to free one end of this guide salient in the publication of claims 5 or 6 while it is pillar-shaped.

[Claim 8] It has the sliding pattern for the aforementioned rotating type electrical-part section making the aforementioned rotation operation object and the sliding child rotated in one **** in the publication of a claim 4. While forming the whole of each stationary contact of this sliding pattern, the above 1st, and the 2nd press switching device in the same field of the aforementioned flexible substrate Combined-control blocking force equipment characterized by laying the stationary-contact formation field of the aforementioned press switching device which this flexible substrate is made crooked in the shape of S character, and is arranged at the side near the aforementioned keytop on the aforementioned driver.

[Claim 9] Combined-control blocking force equipment characterized by preparing the hung section of the couple by which each is hung on the section that the aforementioned couple should stop hanging on the aforementioned flexible substrate while preparing the section in the publication of a claim 8 that a couple should stop hanging on the aforementioned driver.

[Claim 10] Combined-control blocking force equipment characterized by having the spring member in which the aforementioned rotating type electrical-part section carries out elastic deformation with rotation of the aforementioned rotation operation object in one publication of the claims 1-9.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the combined-control blocking force equipment which can perform rotation operation and press operation, especially, is used for a digital camera etc. and relates to suitable combined-control blocking force equipment.

[0002]

[Description of the Prior Art] If a keytop is arranged in the center section which can be rotated and to pinch (rotation operation object) and rotation operation of the tongue is carried out recently, output signals, such as resistance, can be changed, and if press operation of the keytop is carried out, the combined-control type input unit which enabled it to perform the on-off change of a push switch is spreading. This conventional kind of input unit arranges the press switch section by which a press drive is carried out through a keytop inside the rotating type electrical-part section by which a rotation drive is carried out through a tongue, outline composition is carried out, and the tongue and the sliding child who rotates in one are incorporated by the rotating-type electrical-part section in slide contact with the sliding pattern, and the press switching device with a click mechanism the traveling contact and the stationary contact were made to counter is included in the press switch section. So, rotation operation of a tongue and two kinds of alter operation called press operation of a keytop can be performed alternatively, and application on various electronic equipment is expected as a compact combined-control-type input unit.

[0003]

[Problem(s) to be Solved by the Invention] Since the input unit which can respond to focusing with suitable press operation of a two-step formula and shutter operation was required as zooming with suitable rotation operation, for example in the case of a digital camera with a zoom function, it was not able to make elegance apply to this electronic equipment conventionally, although the conventional combined-control blocking force equipment mentioned above can perform alternatively rotation operation and two kinds of alter operation called press operation.

[0004] this invention was made in view of the actual condition of such conventional technology, and the purpose is in being able to perform rotation operation and press operation of a two-step formula, and offering the compact combined-control blocking force equipment in which application to a digital camera with a zoom function is possible.

[0005]

[Means for Solving the Problem] In order to attain the purpose mentioned above, the combined-control blocking force equipment of this invention The rotation operation object which has opening and carries out self-reset to a predetermined position and which can be rotated, and the rotating type electrical-part section by which a rotation drive is carried out through this rotation operation object, The keytop by which is arranged in the aforementioned opening and press operation is carried out in the direction of axis of rotation of the aforementioned rotation operation object, It has the press switch section by which is arranged in the center section of the aforementioned rotating type electrical-part section, and a press drive is carried out through the aforementioned keytop. The aforementioned press switch section considered as the composition which has the 1st press switching device and the 2nd press switching device by which actuation loads differed mutually and laminating arrangement was carried out along the press operation direction of the aforementioned keytop.

[0006] thus -- if a keytop is pushed in in the input unit constituted -- first -- an actuation load -- smallness -- while -- if a press switching device changes from OFF to ON and pushes in a keytop further -- an actuation load -- size -- since the press switching device of another side changes from OFF to ON, press operation of a two-step formula can be performed Moreover, by rotating a rotation operation object, if the output signal of the rotating type electrical-part section can be changed and the rotation operating physical force is removed, the self-reset of the rotation operation object will be carried out to a predetermined position. In addition, it is desirable if the spring member which makes the self return mechanism to which the self-reset of the rotation operation object is carried out, and carries out elastic deformation to the rotating type electrical-part section with rotation of a rotation operation object is incorporated.

[0007] Moreover, as for the stationary contact of the press switching device arranged among the 1st and 2nd press switching

devices at the side near a keytop at least, in this composition, forming in a flexible substrate is desirable. If the whole of each stationary contact of the this sliding pattern, the 1st, and 2nd press switching devices is formed in the common flexible substrate in general composition of that the rotating type electrical-part section has especially the sliding pattern for making the sliding child who rotates in one **** on a rotation operation object, combined-control blocking force equipment also with assembly nature there are few part mark and good will be obtained.

[0008] Moreover, the driver with which the press switch section intervenes between the 1st press switching device and the 2nd press switching device, and carries out the press drive of one press switching device in this composition, If it has a guide means to guide movement of the driver which meets in the press operation direction of a keytop, and the click means made as { occur / a click feel /, respectively / the 1st and 2nd press switching devices / at the time of an input } Since slide movement of the driver can be smoothly carried out along the press operation direction of a keytop, it becomes unnecessary to adopt press drives which are easy to enlarge, such as a hinge mechanism, and becomes easy to attain the miniaturization of equipment. If it prepares in one to the supporter material carried in the 1st and 2nd press switching devices and two or more guide salients which are arranged in that case so that the press switch section may be surrounded, and are prolonged in the press operation direction of a keytop are made with the aforementioned guide means, two or more suitable guide salients for a miniaturization can be made to perform slide movement of a driver still more smoothly.

[0009] In addition, if this combined-control blocking force equipment has made the composition attach an attachment salient to this supporter material in the state where of the guide salient was equipped with the guide object which has two or more attachment salients prolonged in a retrosé from the aforementioned guide salient, the frame which connects the end face side of these guide salient, and this frame, and the aforementioned flexible substrate was pinched at a frame and the aforementioned supporter material, since the float of the flexible substrate on supporter material can prevent, it is desirable. moreover, elastic deformation is possible in the aforementioned guide salient -- if it supposes that it is pillar-shaped and the claw part which can stop a driver is prepared in free one end of this guide salient, since the height position convention at the time of defluxion prevention of a driver or un-operating it can be performed and assembly nature will also improve, without complicating composition, it is desirable.

[0010] In moreover, the case of general composition of having the sliding pattern for the rotating type electrical-part section making the sliding child who rotates in one **** on a rotation operation object. The whole of each stationary contact of the this sliding pattern, the 1st, and 2nd press switching devices is formed in the same field of a common flexible substrate. If the stationary-contact formation field of the press switching device which this flexible substrate is made crooked in the shape of S character, and is arranged at the side near a keytop is made the composition of laying on the aforementioned driver. The electric conduction pattern was formed only in one side, it is cheap, and since an easy flexible substrate can also use inclusion work, it is desirable. If the hung section of the couple by which each is hung on the section that the aforementioned couple should stop hanging on a flexible substrate is prepared while preparing the section that a couple should stop hanging on a driver in that case, since a flexible substrate will be simply attached in a driver, without using a double-sided pressure sensitive adhesive sheet etc., improvement in assembly nature can be aimed at.

[0011] [Embodiments of the Invention] The decomposition perspective diagram of the combined-control blocking force equipment which drawing 1 will require for the example of 1 operation form of this invention if it explains referring to a drawing about the example of an operation form, The cross section with which drawing 2 meets the plan of this input unit, and drawing 3 meets the A-A line of drawing 2 ; the cross section with which drawing 4 meets the B-B line of drawing 2 ; The plan of this input unit that drawing 5 omits a keytop and is shown, and drawing 6 The bottom plan view of the rotation operation object of this input unit, The plan of the keytop of this input unit and drawing 8 drawing 7 The plan of the receipt object of this input unit, Drawing 9 the cross section of this receipt object, and drawing 11 for the bottom plan view of this receipt object, and drawing 10 The bottom plan view of the sliding child receptacle with a sliding child of this input unit, The development of the flexible substrate of this input unit and drawing 13 drawing 12 The plan of the driver of this input unit, The side elevation of this driver and drawing 15 drawing 14 The plan of the guide object of this input unit, Drawing 16 is explanatory drawing [plan / of the support plate of this input unit] at the time of un-operating / in which of the side elevation of this guide object and drawing 17 show, and drawing 18 shows the self return mechanism and stopper style of this input unit / it, and explanatory drawing at the time of the rotation operation corresponding to drawing 18 in drawing 19 .

[0012] The combined-control blocking force equipment which shows the whole composition to drawing 1 - drawing 5 is equipment applied to a digital camera with a zoom function. The support plate 1 which this input unit becomes from a metal plate etc., and the flexible substrate 2 by which the electric conduction pattern is formed in insulating base material, such as polyester film The 1st click spring 3 of the shape of a dome which serves as the 1st traveling contact, and the guide object 4 made of synthetic resin which has guide salient of two or more 4a, It has press salient 5a and shows around at the aforementioned guide salient 4a. The driver 5 made of synthetic resin which can go up and down, With the 2nd click spring 6 of the shape of a dome which serves as the 2nd traveling contact, and the metal sliding child 7 The sliding child receptacle 8 of the product made of synthetic resin which attached this sliding child 7, and the receipt object 9 made of synthetic resin which has the ceiling section 10 and a tubed part 11, It is mainly constituted by the torsion spring 12 for self returns, the keytop 13 made of synthetic resin, and the rotation operation object 14 made of synthetic resin united with the sliding child receptacle 8.

[0013] In order to attach in three stomata 1 for attaching guide object 4 as shown in support plate 1 at drawing 1 and drawing

17 a, six square hole 1b arranged so that stoma 1a may be surrounded, in order to attach the receipt object 9, and the external mechanism in which support-plate 1 self is not illustrated, round hole 1c arranged in the four corners is drilled.

[0014] As shown in drawing 12, the flexible substrate 2 is deeply cut from one side of rectangle-like base 2a and this base 2a, and possesses 2d of band-like drawer sections prolonged from one side of base 2a in the right-angled sense to band-like section 2c which prepares 2b and is prolonged, and this band-like section 2c. 2g of two stomata arranged four long hole 2e and 2f of two notches arranged in the shape of a periphery, and inside long hole 2e and 2h of mounting holes located in four corners are prepared in base 2a. the stop of round hole 2i for inserting press salient 5a of a driver 5 in band-like section 2c, and the couple for stopping a driver 5 -- Holes 2j and 2k are formed And the 1st stationary contact 15 and circular sliding pattern 16 of a couple are formed on base 2a, and the 2nd stationary contact 17 of a couple is formed on the point of band-like section 2c, and ***** 18 which leads each stationary contacts 15 and 17 and the sliding pattern 16 to up to 2d of drawer sections further is formed in one side of this flexible substrate 2. In addition, these electric conduction patterns print conductive paste, such as silver and carbon, and are formed, and abbreviation band-like (circular) a resistance pattern (outside pattern) and a current collection pattern (inside pattern) are prepared in the sliding pattern 16. Moreover, these electric conduction patterns are located and lengthened about to the point of the 1st and 2nd stationary contacts 15 and 17 and sliding patterns 16, or 2d of drawer sections, and are covered with the insulating resist layer 19 (hatching portion of drawing 12) except for the line 18.

[0015] While this flexible substrate 2 makes 2h of the mounting hole agree in the aforementioned round hole 1c, it is in the state where long hole 2e and 2f of notches were made to agree in the aforementioned square hole 1b, and base 2a is laid on a support plate 1. Moreover, band-like section 2c of the flexible substrate 2 is incorporated in the state where you made it crooked in the shape of S character, as shown in drawing 1 and 3.

[0016] The 1st click spring 3 of the shape of a dome which serves as the 1st traveling contact is formed by the flat spring made from stainless steel, for example, foaming of the board thickness is carried out to the shape of dome shape whose diameter is 5mm by 0.07mm. This click spring 3 was laid on the 1st [of base 2a of the flexible substrate 2] stationary-contact 15 formation field, always contacted the outside stationary contact 15 in a circle, and has countered it possible [attachment and detachment] at the stationary contact 15 of an inside circle configuration. In addition, as this click spring 3 is covered with the insulation sheet with which the binder was applied to one side and which is not illustrated, it is being fixed to the flexible substrate 2. And by the 1st press switching device's S's1 consisting of the 1st click spring 3 and 1st stationary contact 15, and applying a little big press operating physical force to this click spring 3, the center section of the reversed click spring 3 is contacted to the stationary contact 15 of the circle configuration which counters, and the flow of stationary-contact 15 of the inside and an outside can be aimed at now.

[0017] Although the 2nd click spring 6 of the shape of a dome which serves as the 2nd traveling contact is also formed by the flat spring made from stainless steel, since foaming of the board thickness is carried out to the shape of dome shape whose diameter is 6mm, for example by 0.05mm, a center section can be reversed by the press operating physical force smaller than the 1st click spring 3. This 2nd click spring 6 was laid on the 2nd [of band-like section 2c of the flexible substrate 2] stationary-contact 17 formation field, always contacted the outside stationary contact 17 in a circle, and has countered it possible [attachment and detachment] at the stationary contact 17 of an inside circle configuration. In addition, as this click spring 6 is also covered with the insulation sheet with which the binder was applied to one side and which is not illustrated as well as the 1st click spring 3, it is being fixed to the flexible substrate 2. And by the 2nd press switching device's S's2 consisting of the 2nd click spring 6 and 2nd stationary contact 17, and applying a comparatively light press operating physical force to this click spring 6, the center section of the reversed click spring 6 is contacted to the stationary contact 17 of the circle configuration which counters, and the flow of stationary-contact 17 of the inside and an outside can be aimed at now.

[0018] As for this frame 4b to frame 4b which connects the pillar-shaped four end face side of guide salient 4a and each guide salient 4a in which elastic deformation is possible, and guide salient 4a, the guide object 4 possesses attachment salient of three 4c prolonged in a retrose, as shown in drawing 1 and drawing 15, and 16. 4d of claw parts which project to the inner direction is prepared in the nose-of-cam side (free one end) of each guide salient 4a. Moreover, engagement slot 4e is prepared in frame 4b by making the part project in the shape of L character to the method of outside.

[0019] This guide object 4 is in the state which inserted each attachment salient 4c in 2g of stomata of the flexible substrate 2, slitting 2b, or stoma 1of support plate 1 a, and laid frame 4b on base 2a of the flexible substrate 2, and when heat closes and uses the point of each attachment salient 4c as the base of a support plate 1, it is fixed to a support plate 1. Although this will be in the state where the 1st press switching device S1 has been arranged in the space inside frame 4b, since base 2a of the flexible substrate 2 is pinched between frame 4b and a support plate 1, there is no fear of floating from a support plate 1 of this S1 press switching device.

[0020] Press salient 5a for a driver 5 pushing in the 1st click spring 3, as shown in drawing 1 and drawing 13, and 14, Plate-like section 5b which is making this press salient 5a project from a center section, and engagement notch 5c by which it is formed in four places of the periphery section of this plate-like section 5b, and guide salient 4a is loosely inserted in each, Small salient 5e which projects from plate-like section 5b to the side by the reverse side is provided hook 5d and this hook 5d of the shape of L character which projects from plate-like section 5b to the side.

[0021] the stop of the couple by which this driver 5 is formed in band-like section 2c of the flexible substrate 2 -- the 2nd stationary-contact 17 formation field of band-like section 2c is laid on plate-like section 5b in the state where there

is no slack, by hanging Holes 2j and 2k on hook 5d and small salient 5e, respectively, stopping, and carrying out So, there is no fear of floating from plate-like section 5b of the 2nd S2 press switching device. Moreover, as shown in drawing 3, while press salient 5a of a driver 5 is inserted in round hole 2i of band-like section 2c crooked in the shape of S character, the cuff portion of band-like section 2c is inserted in the side near base 2a rather than this round hole 2i at engagement slot 4e of the guide object 4. And to guide salient 4a of the guide object 4, where position ***** is carried out, engagement notch 5c of the driver 5 which stop hanging band-like section 2c, and carried out it If plate-like section 5b is pushed in sagging each guide salient 4a to the method of outside, in the stage where bending of each guide salient 4a was canceled, a driver 5 will be incorporated possible [rise and fall] inside the guide object 4, and press salient 5a will be carried on the 1st click spring 3. In addition, since guide salient 4a in engagement notch 5c shows around, rise-and-fall operation of a driver 5 is performed smoothly. Moreover, by 4d of claw parts by the side of the nose of cam of each guide salient 4a, while the omission stop to the upper part of a driver 5 is performed, the height position of the driver 5 at the time of un-operating it is specified.

[0022] The sliding child receptacle 8 is a monotonous ring object with which a periphery configuration has opening 8a in the center section by the shape of a polygon as shown in drawing 1 and drawing 11, and communicating-pore 8b is formed in four regular intervals places. The sliding child 7 is attached in the base of the sliding child receptacle 8, and this sliding child 7 ***** to the sliding pattern 16 on base 2a of the flexible substrate 2.

[0023] The ceiling section 10 which the receipt object 9 has opening 10a in the center section as shown in drawing 1 and drawing 8 - drawing 10, and prepared circular long hole 10b in four places, Stopper salient 10c set up on this ceiling section 10, the tubed part 11 installed from the periphery section of the ceiling section 10 in the lower part, and interval attachment salient 11a -- six places protruded on the base of this tubed part 11 -- are provided. Moreover, on the ceiling section 10, 10f of spring receptacle sections which make taper side 10e fix to 10d of annular walls which carry out position regulation of the torsion spring 12 for self returns from the inside, and the edge of a torsion spring 12 firmly is set up, and a torsion spring 12 is incorporated between 10d of annular walls, and 10f of spring receptacle sections.

[0024] As shown in drawing 3 and 4, in opening 10a of this receipt object 9, guide salient 4a of a driver 5 or the guide object 4 which laid the 2nd press switching device S2 is arranged. Moreover, inside the tubed part 11 of the receipt object 9, the sliding child receptacle 8 is arranged in the state where the ceiling section 10 was made to counter, and the peripheral face of this sliding child receptacle 8 ***** to the inner skin of a tubed part 11. And when connection salient of four 14b of the rotation operation object 14 arranged on the ceiling section 10 of the receipt object 9 is inserted in long hole 10b, respectively, it inserts in communicating-pore 8b of the sliding child receptacle 8 further and heat closes and uses the point of each connection salient 14b as the base of the sliding child receptacle 8; the rotation operation object 14 and the sliding child receptacle 8 are unified. Therefore, rotation operation of the rotation operation object 14 will be guided by the inner skin of the tubed part 11 which functions as the bearing surface to the peripheral face of the sliding child receptacle 8.

[0025] The rotation operation object 14 has opening 14a for arranging a keytop 13 in the center section, as shown in drawing 1, 2 and drawing 5, and 6. In the base of this rotation operation object 14, connection salient 14b protrudes on four regular intervals places, and the unification with the sliding child receptacle 8 is made by such connection salient 14b. 14d of stopper move ways for inserting possible [movement of spring press wall 14c for stuffing into the base of the rotation operation object 14 the edge of the torsion spring 12 interposed between the ceiling sections 10 of the receipt object 9 again and stopper salient 10c on the ceiling section 10], and regulating a rotation is prepared. In addition, a keytop 13 is in the state by which the baffle was carried out with the rotation operation object 14, press salient 13a which protruded in the center of an inner base is carried on the 2nd click spring 6, and as shown in drawing 3 and 4, the wall section of the rotation operation object 14 shows rise-and-fall operation of a keytop 13 to it.

[0026] Thus, in giving explanation of the combined-control blocking force equipment constituted of operation, operation of the press switch section by which a press drive is first carried out through a keytop 13 is explained, and operation of the rotating type electrical-part section by which a rotation drive is carried out through the rotation operation object 14 next is explained.

[0027] the time of being specified quantity push *** first, when the operator pushes in the keytop 13 with the finger now -- press salient 13a of a keytop 13 -- an actuation load -- smallness -- since reversal operation of the 2nd click spring 6 is carried out, the 2nd press switching device S2 changes from OFF to an ON state. And if the keytop 13 is pushed in further, since the driver 5 descends maintaining the 2nd press switching device S2 at an ON state, reversal operation of the 1st click spring 3 whose press salient 5a of this driver 5 is an actuation load and which becomes size is carried out, and the 1st press switching device S1 changes from OFF to an ON state. Therefore, an operator can realize what the 1st press switching device S1 turned on, if a click feel occurs while what the 2nd press switching device S2 turned on can be realized and the keytop 13 is pushed in strongly, if a click feel occurs while pushing in the keytop 13 lightly. Specifically, in the case of this example of an operation form, if the 2nd press switching device S2 turns on, focusing of a digital camera will be performed, and if the 1st press switching device S1 turns on, shutter operation will be performed.

[0028] Moreover, if an operator rotates the rotation operation object 14, since the sliding child 7 will rotate in one and will slide on the sliding pattern (resistance pattern and current collection pattern) 16 top, the resistance according to the position of the sliding child 7 who rotated will be outputted. That is, different resistance according to the rotation of the rotation operation object 14 can be made to output, and when it is this example of an operation gestalt, zooming of a digital camera is performed by rotation operation of the rotation operation object 14.

[0029] Although spring press wall 14c of a couple and taper side 10e of the couple of 10f of spring receptacle sections are *** (ing) to the both ends of a torsion spring 12 when rotation operation of the rotation operation object 14 is not carried out as shown in drawing 18 if the self return mechanism of this rotation operation object 14 is explained When the rotation operation object 14 is rotated, as it is shown in drawing 19, one spring press wall 14c separates from one edge of a torsion spring 12, and in the state where it was firmly fixed to taper side 10e this edge of whose is 10f of spring receptacle sections of the receipt object 9 The other-end section pushes on spring press wall 14c of another side, and is stir-fried. So, if the rotation operating physical force over the rotation operation object 14 is removed, spring press wall 14c will be put back by the edge of the torsion spring 12 currently pushed and stir-fried, and the self-reset of the rotation operation object 14 will be carried out to the predetermined position shown in drawing 18. That is, if an operator separates a finger from the rotation operation object 14, a zoom scale factor will return to the original state automatically. Moreover, if the rotation operation object 14 is rotated, when stopper salient 10c of the receipt object 9 will move along 14d of stopper move ways and will carry out specified quantity rotation of the rotation operation object 14, as shown in drawing 19, in contact with the end face of 14d of stopper move ways, as for stopper salient 10c, the further rotation of the rotation operation object 14 is regulated. So, when an excessive rotation operating physical force joins the rotation operation object 14, there is no fear of connection salient 14b colliding with the end face of long hole 10b of the receipt object 9, and being damaged.

[0030] if a keytop 13 is pushed in in this example of an operation form as mentioned above -- first -- an actuation load -- smallness -- while -- if the press switching device S2 changes from OFF to ON and pushes in a keytop 13 further -- an actuation load -- size -- since the press switching device S1 of another side changes from OFF to ON, press operation of a two-step formula can be performed Moreover, by rotating the rotation operation object 14, the output signal of the rotating type electrical-part section can be changed suitably, and the self-reset of this rotation operation object 14 can be carried out to a predetermined position according to a self return mechanism. Therefore, if focusing with suitable press operation of a two-step formula and shutter operation are made to perform by the 1st and 2nd press switching devices S1 and S2 and the rotation operation object 14 is made to perform zooming with suitable rotation operation in case this combined-control blocking force equipment is applied to a digital camera, operability improves and a miniaturization can also be promoted. in addition, the actuation load which precedes and carries out reversal operation although it has set up in this example of an operation form so that the 2nd click spring 6 near a keytop 13 may carry out reversal operation first and the 1st downward click spring 3 may subsequently carry out reversal operation at the time of press operation -- smallness -- you may arrange a click spring below

[0031] Moreover, while having formed altogether the sliding pattern 16 of the 1st and 2nd press switching devices S1 and S2 and the rotating type electrical-part section in the same field of the common flexible substrate 2, the combined-control blocking force equipment mentioned above Since it is made the composition of making this flexible substrate 2 crooked in the shape of S character, and laying the stationary-contact formation field of an upper press switching device (2nd press switching device S2) on a driver 5 As a flexible substrate 2, the cheap thing which formed the electric conduction pattern only in one side can be used, and the inclusion work is also easy. and this flexible substrate 2 -- the stop of a couple -- since the stationary-contact formation field of band-like section 2c can be laid on plate-like section 5b in the state where there is no slack, by hanging, stopping and setting Holes 2j and 2k to hook 5d of a driver 5, and small salient 5e, respectively, the flexible substrate 2 can be easily attached in a driver 5, without using a double-sided pressure sensitive adhesive sheet etc.

[0032]

[Effect of the Invention] this invention is carried out with a gestalt which was explained above, and does so an effect which is indicated below.

[0033] It has the rotating type electrical-part section by which a rotation drive is carried out through a rotation operation object, and the press switch section by which a press drive is carried out through the keytop arranged in opening of a rotation operation object. Since this press switch section is combined-control blocking force equipment which has the 1st press switching device and the 2nd press switching device by which actuation loads differed mutually and laminating arrangement was carried out along the press operation direction of a keytop Rotation operation and press operation of a two-step formula can be performed, and it is easy to attain the miniaturization of equipment, and becomes applicable to a digital camera with a zoom function.

[0034] Moreover, if all of each stationary contact of the 1st and 2nd press switching devices and the sliding pattern of the rotating type electrical-part section are formed in the common flexible substrate, it will become easy to aim at curtailment of part mark, and improvement in assembly nature. On the driver which carries out the press drive of one press switching device, if it is made the composition of laying the stationary-contact formation field of the press switching device of another side, form each stationary contact and a sliding pattern in the same field of a flexible substrate, and this flexible substrate is made crooked in the shape of S character in that case, an electric conduction pattern was formed only in one side, it is cheap and inclusion work can also use an easy flexible substrate.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the decomposition perspective diagram of the combined-control blocking force equipment concerning the example of 1 operation gestalt of this invention.

[Drawing 2] It is the plan of this input unit.

[Drawing 3] It is the cross section which meets the A-A line of drawing 2 .

[Drawing 4] It is the cross section which meets the B-B line of drawing 2 .

[Drawing 5] It is the plan of this input unit in which a keytop is omitted and shown.

[Drawing 6] It is the bottom plan view of the rotation operation object of this input unit.

[Drawing 7] It is the plan of the keytop of this input unit.

[Drawing 8] It is the plan of the receipt object of this input unit.

[Drawing 9] It is the bottom plan view of this receipt object.

[Drawing 10] It is the cross section of this receipt object.

[Drawing 11] It is the bottom plan view of the sliding child receptacle with a sliding child of this input unit.

[Drawing 12] It is the development of the flexible substrate of this input unit.

[Drawing 13] It is the plan of the driver of this input unit.

[Drawing 14] It is the side elevation of this driver.

[Drawing 15] It is the plan of the guide object of this input unit.

[Drawing 16] It is the side elevation of this guide object.

[Drawing 17] It is the plan of the support plate of this input unit.

[Drawing 18] It is explanatory drawing at the time of un-operating [which shows the self return mechanism and stopper style of this input unit]-it.

[Drawing 19] It is explanatory drawing at the time of the rotation operation corresponding to drawing 18 .

[Description of Notations]

1 Support Plate (Supporter Material)

2 Flexible Substrate

2a Base

2c Band-like section

2j and 2k a stop -- hole (hung section)

3 1st Click Spring

4 Guide Object

4a Guide salient

4b Frame

4c Attachment salient

4d Claw part

5 Driver

5a Press salient

5b Plate-like section

5d Hook (stop hanging section)

5e Small salient (stop hanging section)

6 2nd Click Spring

7 Sliding Child

8 Sliding Child Receptacle

9 Receipt Object

10 Ceiling Section

11 Tubed Part

11a Attachment salient

12 Torsion Spring (Spring Member)

13 Keytop

14 Rotation Operation Object

14a Opening

14b Connection salient

15 1st Stationary Contact

16 Sliding Pattern

17 2nd Stationary Contact

S1 1st press switching device

S2 2nd press switching device